

Appendix E

COIC Format and Content

E-1. Overview of critical operational issues and criteria

COIC are, by definition, those decision-maker key operational concerns (issues) with bottom line standards of performance (criteria), that, if satisfied, signify that a system is operationally ready to proceed to FRP.

a. Critical operational issues are those key decision-maker operational concerns that must be answered for the FRP DR to proceed. They are operationally oriented and not technology, cost, or politically focused. A typical set of COI is given below. Note that a system is considered operationally ready (effective, suitable, and survivable) to proceed to full production when the following operational concerns are answered affirmatively:

(1) Does the system satisfy the reasons for the operational requirement being established and an acquisition program initiated?

(2) Can the system accomplish its critical mission(s)?

(3) Can the system maintain trained preparedness in peacetime for critical mission(s)?

(4) Can the system be deployed when and where needed for critical missions?

(5) Can the system be sustained during combat and/or other critical operations? Note: This does not mean that there are always four or five COI. These concerns may be adequately addressed in one, three, or more COI as appropriate for a system. However, COI by their nature are few in number. Additionally, programs covered by the Defense Acquisition Guidebook require a COI for interoperability. One or more concerns may be covered in the criteria or may be considered not to be applicable for the system. In the latter case, the COIC development team must be prepared to justify such determination and address it in the COIC approval submission memorandum (see app F).

b. COIC criteria are bottom line standards of performance for satisfying a COI and are “show stoppers” if not satisfied for the FRP DR. If a shortfall exists for one or more of the COIC criteria at the FRP DR, convincing evidence (that is, other effectiveness, sustainability, and cost data, analyses, and resulting considerations along with review of program alternatives) must be provided for the decision authority to allow the program to proceed. Like the issues, the criteria are operationally oriented and not technology, cost, or politically focused. This does not mean that the criteria are operational test oriented, just that the criteria provide operationally relevant measures. While most criteria will be answered using multiple data sources including some form of operational test, some criteria, such as NBC contamination hardening, when a specific program objective, must depend on developmental test or simulation output data. Each critical operational issue will have at least one criterion.

Note. For systems on the OSD T&E Oversight List, the DOT&E provides the statutory Beyond LRIP (BLRIP) Report to SECDEF and Congress before the FRP DR. This report concludes whether the system is operationally effective, suitable, and survivable to enter production. If there are shortfalls in any COIC, any evidence that the system is still effective, suitable, and survivable must be provided to and considered by the DOT&E before this report is released.

c. The system of concern is the total operational system (see fig E-1) as a composite rather than any of its component parts. Simultaneously, the total system of interest may be a single system (for example, a truck with trailer) or an operational unit (for example, a team or platoon). This has several benefits, not the least of which is fewer issues. In addition, they are more relevant to operations than if focused on system components, and the potential for duplicate coverage is reduced.

d. The COIC structure (fig E-2) provides for each issue: a scope paragraph (conditions for evaluating the issue), its associated criteria, and a rationale section (basis for each criteria). Additionally, the structure provides a notes section including two standardized mandatory notes (the first addressing the total system focus and coverage of the criteria; the second addressing the pass/fail application of the COIC) and other system specific notes as needed. A third mandatory note (stating that COIC are based on initial requirements and will be updated prior to MS C) is included for COIC supporting the MS B TEMP. If this is a system for which MS C is also the FRP DR and the ORD requirements and COIC are still soft (such as, require update), then a point between MS B and C should be identified for ORD, COIC and TEMP update. As the structure indicates, the criteria are the instruments for judging whether an issue is satisfied (that is, achievement of all criteria results in a satisfied issue). This structure applies to COIC coordination, approval, and processing; TEMP content; and SEP content. COIC are coordinated, staffed, and approved as a stand-alone document. Chapter 4, figures 4-8 and 4-10, provides more details on the COIC coordination and submission packages.

e. Initial COIC are developed, approved, and included in the TEMP prior to MS B. As the program progresses they are updated as needed (particularly in response to the ORD update for MS C when a separate FRP DR is planned). The issues being based on the MNS will seldom change; however, the criteria will change as the operational requirement matures and in response to significant program restructures (for example, shifting of pre-planned product improvements or evolutionary acquisition increments). Criteria for the COIC applicable to the TEMP at MS B may be “soft” (that is, provide a performance standard but not a final performance threshold; for example, must have high probability of accomplishing mission X). Criteria will be “firm,” measurable performance thresholds for the COIC applicable to the TEMP at MS C and subsequent COIC updates. COIC updates required by program restructure/redirection between MS B and C (but not in response to the revised ORD preparatory to MS C) may continue to be “soft” if MS C is not the FRP decision for the program. These are in effect the MS B TEMP COIC.

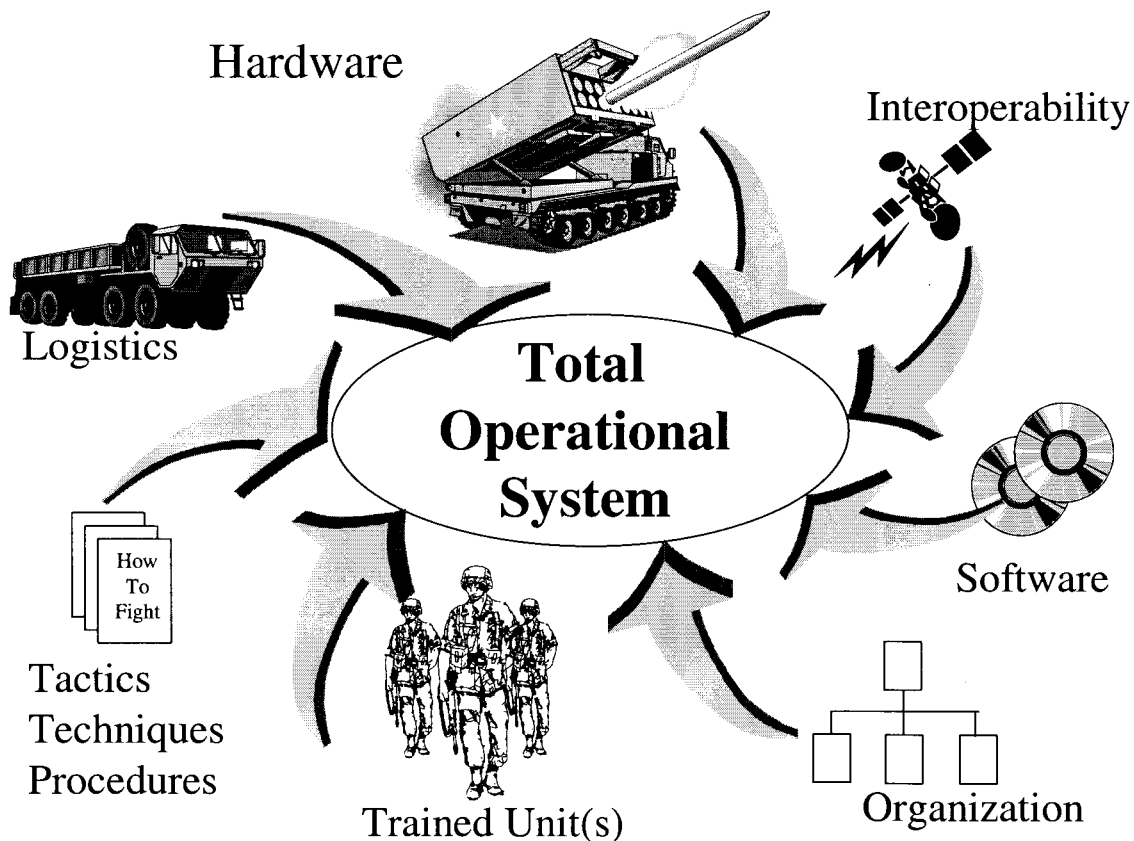


Figure E-1. Total operational system

E-2. Identifying and developing critical operational issues

a. *Critical operational issues.* Critical operational issues, by definition, are those key operational concerns expressed as questions that when answered completely and affirmatively signify that a system or materiel change is operationally ready to transition to full-rate production. They are few in number, based on the MNS, and focused on the FRP DR. There are four key components of a properly structured critical operational issue statement:

- (1) The interrogative. An interrogative word demanding a “yes” or “no” answer (for example, “Does,” “Can,” or “Is”).
- (2) The system. Identification of the system of concern (for example, system X or a platoon equipped with system X).
- (3) The capability. A capability of concern (for example, robust voice and data communication or effective aerial reconnaissance).
- (4) The conditions. A set of applicable operational conditions (for example, during combat operations or as employed by Special Operations Forces).

b. *Focus of critical operational issues.*

(1) Critical operational issues focus on the total operational system as an entity and its ability to satisfy the operational capabilities defined in the MNS or Mission Needs Analysis. This focus for COIC results in a few issues that seldom change as the system progresses through the acquisition process. While the norm is four issues (one for mission accomplishment, one for deployability/mobility/survivability, one for interoperability, and one for sustainability), as few as one (single shot item or system change) or as many as six (a family of trucks) may be appropriate. This focus breaks the mindset of separate operational effectiveness and suitability issues. A single issue will often cover the areas of mission performance, survivability, RAM, MANPRINT, and software performance (for example, probability of successful communications for a communications net or probability of find and kill targets entering a system’s (could be an organization equipped with the new system) area of influence for a direct fire weapon).

**Critical Operational Issues and Criteria
for
the “X” System, System “X” Block “Z”, or “Y” Modification to the “X” System)
for Test and Evaluation Master Plan Supporting
Milestone B or C, FRP Decision, Modification Approval Package, or other event**

1.0 Issue: (see para E-2.)

1.1 Scope: (see para E-3.)

1.2 Criteria: (see para E-4.)

1.2.1 A dendritic numbering system is used to standardize format.

1.2.2

1.2.n

1.3 Rationale: (see para E-5.)

1.3.1 Rationale subparagraphs correspond to those of each criterion.

1.3.2

1.3.n

2.0 Issue: Subsequent issue sets are numbered 2 through n.

Note: The total issue sets is normally three or four and 9 to 12 criteria. As few as 1 issue set with 7 criteria (for example, single shot item) or as many as 7 issue sets with 20 criteria (for example, a truck family) may be right for a given system. Key is identifying and defining only the “show stoppers” for the good enough system.

Note 1: (mandatory) (see para E-6b.)

Note 2: (mandatory) (see para E-6c.)

Note 3: (mandatory for MS B TEMP COIC) (see para E-6d.)

Notes 4: through n: (system peculiar -- see para E-6e.)

Figure E-2. COIC structure

(2) Operational relevancy translates as “accomplish critical mission(s),” “maintain trained preparedness for operations,” “can be deployed when and where needed,” and “can be sustained at operational tempo during operations.” “Accomplish critical mission(s)” means not only that the system is capable of performing its mission functions, but is reliable and survivable to the degree needed during the mission; and can interoperate with Army, Allied, and other-Service systems necessary for mission success. “Maintain trained preparedness for operating” assesses the ability of units to train in garrison to be mission ready with the system. This is not limited to training and retaining skills for OT, but looks to the fielded system, its training program, and the soldiers who will lead, operate, and sustain the system. “Can be deployed when and where needed” includes not only movement to the theater of operation but movement within the theater, set-up, and placement into operation. “Can be sustained in combat” assesses the impact of the systems logistics footprint on the employing and sustaining units, when operating at operational tempo, particularly during early employment operations until a large-scale logistics build-up is achieved and/or sustained high intensity operations when a large-scale logistics build-up is achieved.

c. *Mission accomplishment issue.* From the view of minimizing the COI, preparation of the COI starts with the mission accomplishment issue. Normally a good procedure is to frame the critical mission/task order to be given by higher headquarters as the issue (for example, “Can the unit equipped with system X take and hold the tactical objective on the future battlefield?” or “Can truck X pick up and transport required tactical loads to objective location as required in support of combat operations?”). Next, complete the issue with its scope, criteria, and rationale. Then, if there is anything remaining unaddressed in the mission accomplishment area, define that issue with its scope, criteria, and rationale, remaining cognizant of the first issue and criteria to avoid duplication or overlapping coverage. Once the

mission area is complete, consider the need for a sustainment issue. If a sustainment issue is not needed, provide the rationale in your cover memorandum when coordinating the COIC and when submitting the COIC for approval. Once the set of COIC is complete, review it for duplication or overlapping coverage, and eliminate any redundant issue(s).

Note. Interoperability COI is mandatory for all programs on the OSD T&E Oversight List. The Defense Acquisition Guidebook encourages that those programs have a COI for interoperability in the TEMP. The Joint Staff is to ensure system requirement documents (CRDs and ORDs) contain operational interoperability required capabilities and KPP to support development of criteria for this COI.

d. Questions to ask when developing the critical operation issue.

(1) What is the system of interest? For example: individual system (tank round, rifle, and so forth), system of systems (communications network/air defense platoon/information management system), or system component change (improved missile warhead).

(2) Why the system (or system change)? For example: the deficiency the system is being designed to correct or opportunity it is intended to seize.

(3) What is (are) the critical mission(s)? To determine, consider all missions against the question, “Which mission requirement(s), if not satisfied, will engender a “No-Buy” decision?,” where there is more than one but similar critical missions, “Which mission is the more rigorous/demanding?,” and where there is more than one, but distinctly dissimilar critical missions.”

(4) Are there critical user, unit concerns? For example, “Is the system deployable by light forces?”—if not, “Is a “No-Buy” decision in order?”

(5) What are concerns regarding sustainment? For example, “Is the Ammunition Supply Point throughput capacity sufficient to support a significantly higher rate of fire capability for a cannon artillery system?”

e. Do and do not when developing the critical operational issue. Note: Each “Do” is followed when appropriate by one or more companion “Do Nots.”

(1) *Focus.* Do focus the issue so as to properly direct the evaluation and decision. State a question that asks if a task can be performed under the conditions of concern (for example, “Does the Nipper effectively close with, detect, engage, and destroy threat armor under expected battlefield conditions?”).

— Do not over generalize (for example, “Is the Nipper operationally effective?” or “Is the Nipper operationally suitable?”).

— Do not include criteria in the issue statement (for example, “Does the Nipper find and kill X percent of threat armor within its area of operations?”).

(2) *Decision issue.* Do formulate the issue as a question that demands a “yes” or “no” answer (a decision). Begin the question with words such as “Can,” “Does,” or “Is” (for example, “Can the Nipper equipped units achieve and maintain a level of training readiness during peacetime and provide for a wartime readiness capability for sustained combat operations?”). Do not formulate the issue as an investigative question that demands an analytical answer by beginning the question with words such as “How well” or “What is.” For example, do not contrast “How well does the Nipper close with, detect, engage,...?”

Note. An investigative issue may be appropriate for an evaluation focus area (that is, AI) since their focus is the evaluation and not the decision.

(3) *Minimize issues.* Do limit to a few issues by focusing on the total system need and concerns for the FRP DR.

— Do not duplicate coverage by overlapping issues (without good reason).

— Do not get bogged down in the “eaches” of a system (for example, elements of operational effectiveness/suitability and ORD operational characteristics).

(4) *Apply experiences.* Do use COIC approval successes as a guide, not as a rule. Apply experiences during recent COIC approval actions while recognizing system differences. Seek out COIC examples that have been processed recently and are at the same approval level as the set being developed. Talk to those involved in the processing of the COIC example about their experiences and any special considerations that may have affected their COIC approval.

E-3. Identifying and defining the scope in COIC

a. Identifying and defining. The scope, by definition, is a statement of the operational capabilities, definitions, and conditions that focus each issue and its evaluation. There will be a separate scope statement for each issue even though the scope for the second or successive issues may refer to and expand upon the scope statement for issue one. The scope normally begins with the words, “This issue examines...,” and identifies—

(1) *Capabilities.* Operational capabilities to be examined (for example, mission accomplishment, sustainment training, and/or combat sustainment).

(2) *Definitions.* Special terms, either system peculiar requiring definition (for example, system description, grade of

service, communication connectivity, or vehicle payload) or measurement peculiar (for example, start/stop points for time measures).

(3) *Conditions.* Evaluation conditions including: tactical context and scenario (for example, the OMS/MP or the Southwest Asia standard scenario); force structure and deployment considerations (for example, Doctrine and Organization (D&O) Test Support Package (TSP) and Corps/Division/Other slice); approved threat (for example, threat TSP and STAR); crew and maintainer descriptions; and environmental conditions (for example, natural and dirty battlefield).

(4) *Other data sources.* When an issue and any of its criteria require technical test or modeling/analysis support.

b. *Questions to ask when developing the scope of COIC.*

(1) What are the operational capabilities of concern?

(2) Do force-on-force operations apply, and if so at what level (for example, electronic warfare only or armored force in accordance with approved threat package and scenario)?

(3) What friendly force structure and operations are necessary (for example, single system only or force slice; crew and maintainers; or approved OMS/MP and scenario or only elements thereof)?

(4) What environments apply? (for example, natural ones—terrain, visibility, day/night, climate—and battlefield mission oriented protective posture (MOPP) level, obscurant, electronic countermeasures (ECM), and so forth).

(5) What terms need definition (for example, those that are system, operation, and measurement peculiar)?

(6) Do any special evaluation methods apply (for example, technical test or application of analytical means)?

c. *Do and do not when developing the scope of COIC.*

(1) *Focus issue.* Do focus evaluation of the issue by identifying operational capabilities of concern, applicable operational conditions, applicable definitions, and special evaluation methodologies (that is, when technical test, simulation, or other analytical means are used in lieu of or to supplement OT).

— Do not specify criteria (that is, characteristics with performance standards).

— Do not specify rationale (that is, justify the issue or criteria).

— Do not include specific conditions/definitions better suited as part of the criteria (for example, detection/engagement envelope, line of sight, pallet weight for upload, and so forth).

(2) *Development procedure.* Do initially prepare the scope in draft and finalize only after developing applicable criteria (that is, selection of specific criteria may in fact necessitate unique conditions, definitions, or evaluation methodologies not initially anticipated).

E-4. Identifying and developing the criteria in COIC

a. *Criteria in COIC.* Criteria are, by definition, those measures of performance that when achieved signify that the issue has been satisfied and the system should move forward to the FRP DR. Criteria will be few in number, but there will be at least one criterion for each critical operational issue. Criteria will—

(1) *Be focused.* Criteria focus on the total operational system and on providing operational performance standards for the FRP DR, even though they may be “soft” when initially developed and included in the MS B TEMP (for example, “Will be capable of killing tank X versus “Will have a 50 percent chance of finding and killing tank X without becoming targeted by threat weapons.”). When “firm” criteria are known early, they will be stated (for example, “Will be mission capable roll-on, roll-off transportable by C-130 aircraft.”).

(2) *Reflect system maturity.* Criteria are formulated without losing sight of the fact that the “system” is in a constant state of development (for example, even a non-developmental item frequently does not have mature TTP, training, and logistics at the FRP DR).

(3) *Be “show stoppers.”* Criteria are formulated to reflect “show stopper” measures (for example, if all criteria are met, the system is operationally good enough; or, to the contrary, if a criterion is not met, the full-rate production decision should not be given). Mandatory Note #2 is provided to avoid use of criteria as automatic pass/fail measures during evaluation and decision making. Other credible evidence of an operationally effective and suitable system when available will be considered to arrive at the proper decision.

(4) *Be traceable to the ORD and AoA.* This does not mean that criteria are to be direct lift from these documents, but that they are traceable by rationale to specific requirements and findings of these documents. In the case of ORD KPP, they are to be direct lifts from the ORD to the COIC criteria statement. Other criteria statements may be developed by combining two or more requirements into a single higher order of measure, or drawn from sources other than the requirement (like the AoA) to provide specific measures of performance not provided in the requirement document (for special emphasis, when applicable, must be devoted to choosing which type of total system (individual or unit) is to be examined and whether the characteristic of interest is a performance standard or a baseline comparison. Additionally, the following must be considered: criteria mature with the operational requirement (“soft” for MS B TEMP and “firm” for MS C TEMP); the system (hardware, software, and TTP) example, the ORD requires improved survivability whereas cost and AoA data support a need for 20 percent more combat capable systems).

b. *Criterion statement considerations.*

(1) *Criterion statement components.* Figure E-3 depicts the major elements of a criterion statement, each of which must be addressed, and presents an example of a properly constructed criterion statement with explanations for the specific wording. Special emphasis, when applicable, must be devoted to choosing which type of total system (individual or unit) is to be examined and whether the characteristic of interest is a performance standard or a baseline comparison. Additionally, the following must be considered: criteria mature with the operational requirement (“soft” for MS B TEMP and “firm” for MS C TEMP); the system (hardware, software, and TTP) is still maturing at the FRP DR; information available from the requirement document (lack of specificity in performance parameters may increase the potential for evaluation bias and thereby dictate use of baseline comparison); and the acquisition objective (cost may override performance and the criteria therefore reflect current system performance). As reflected in figure E-3, there are choices for each element wherein the correct choice is system/situation dependent (for example, a tank and a communications system will have differently structured criteria). As a criteria structure illustration, consider the criterion statement, “The tank will kill at least 50 percent more enemy armored vehicles at ranges out to three kilometers.” The object to be examined is “the tank.” The characteristic of interest is “kill armored vehicles,” which constitutes a critical performance capability, and the qualifier “more” alludes to a comparison with a baseline. The magnitude of 50 percent is quantitative and the direction “at least.” The constraint condition of “out to three kilometers” is both operational and tight, and “enemy” implies battlefield conditions. The scoring criterion is “kill,” which would be based on definitions (mobility, firepower, catastrophic, and so forth).

Note. A caution on constraint conditions—they must be operationally realistic. If, for example, their interpretation allows for use of unrepresentative threat or friendly operations in test and evaluation, they have been improperly stated.

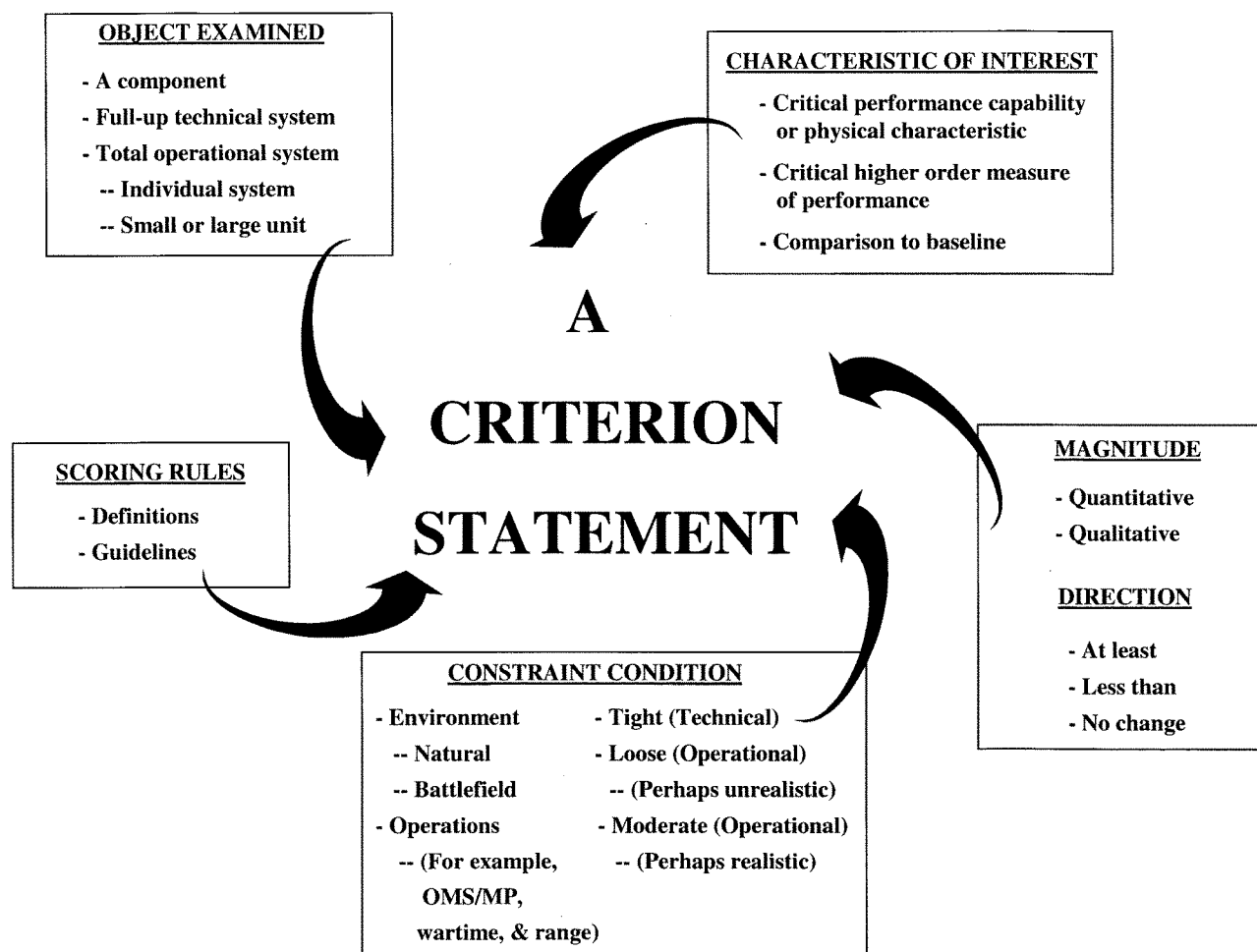


Figure E-3. Major elements of a criterion statement

(2) *Individual system versus organizational unit.* As indicated earlier, special emphasis must be placed on choosing the correct total system—an individual system or an organizational unit—to be the object examined (see fig E-4). Factors that would lead to selection of a single system include: technical criteria (for example, ascend/descend a 60 degree concrete slope); the system operates and/or is employed as an independent system (tractor and trailer); or the purpose of the acquisition is to benefit the system alone (for example, larger caliber tank main gun). Factors which would lead to selection of an organizational unit include: the acquisition is to benefit a unit (for example, an automatic detection and defense system authorized, one to a platoon to improve platoon survivability and operations); the system operates and/or is employed as an element of a unit (for example, an air defense system—fire unit—which operates as a team member providing and receiving target detections, cueings, hand-offs, and engagements to and from other fire units in the platoon); the system represents a system of systems (for example, a force level communications system made up of multiple, dissimilar subsystems); or a concern (characteristic of interest) which requires a unit to measure (for example, more combat capable vehicles remaining). When an organizational unit measure is chosen, the measure must assess the contribution of the system to the unit mission. When multiple systems are present in an organizational unit, some force measures mask the contribution (or lack thereof) to unit mission. Force effective measures such as loss exchange ratios should only be used when the force is composed of a single system in acquisition and when modeling and simulation is part of the evaluation to expand beyond actual test trials. Within a set of COIC, both system and organizational unit measures may be used.

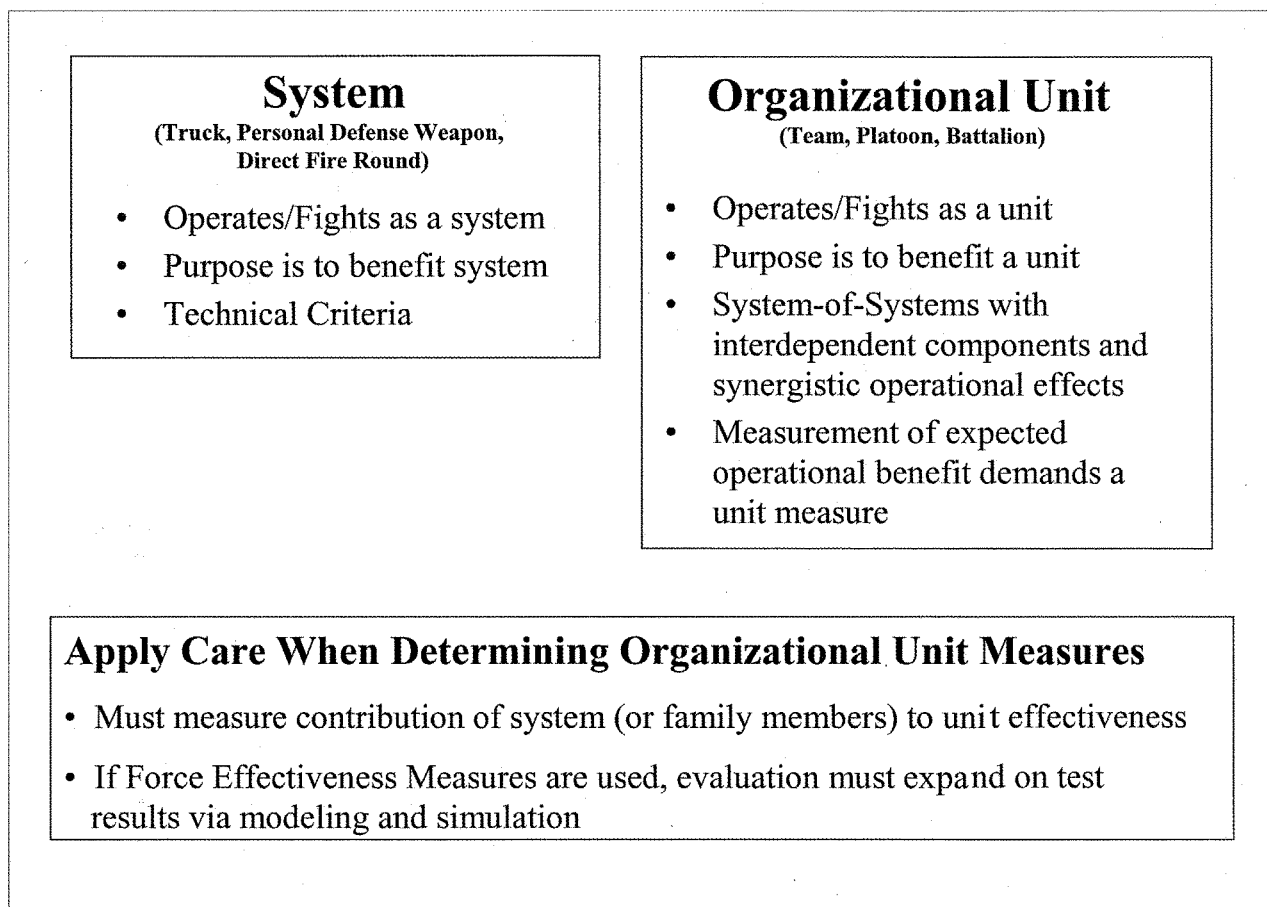


Figure E-4. System versus organizational unit measure

(3) *Performance standard versus baseline comparison criteria.* Also, as indicated above, special emphasis must be placed on determining whether the characteristic of interest can be stated as a performance standard or will require baseline comparison. Most characteristics of interest will be stated as performance standards. However, two key situations will dictate use of baseline comparison: the system is a replacement system or a system change to an existing system and the requirements documents or other sources fail to provide an adequate basis for deriving performance standards; or, the independent system evaluator identifies and justifies, to the satisfaction of the CBTDEV/FP, that there is sufficient risk of bias in T&E. Although this is a break with the past when baseline comparison was reserved for exceptional cases and then only when absolutely necessary, baseline comparison is now encouraged in the situations outlined. It should be kept in mind, however, that the use of baseline comparison criteria results in side-by-side comparison testing to support evaluation of the system. The criticality of this approach to the evaluation effort must therefore be sufficiently high to justify the expenditure of significant additional resources. Another caution is that a baseline comparison may also mask achievement (or non-achievement) of a new key capability that drove the operational requirements and acquisition processes (for example, the new system can be better than the current system but still not accomplish the critical missions).

(4) *Example measures.* Figures E-5 and E-6 present additional system/situation examples of characteristics of interest and typical means of measurement. They are not complete criteria statements.

c. Do and do not when developing the criteria in COIC.

(1) *Minimum need.* Do focus on the minimum needed for the FRP DR—discard or revise if a shortfall would not be a “show stopper.”

- Do not include “desired” characteristics.
- Do not specify “firm” criteria for the MS B TEMP unless known to be stable (for example, transportable by CH-47).
- Do not embed peripheral issues in criteria to ensure evaluation (for example, the training program must be the optimum training strategy).

<u>SITUATION</u>	<u>MEASURE</u>
AUTOMATED INFORMATION SYSTEM	- QUALITY & TIMELINESS OF CRITICAL FUNCTION(S) ACCEPTABLE TO USER
NETTED COMMUNICATIONS SYSTEM	- PERCENT PRIORITY COMMUNICATIONS ACCEPTABLY PASSED BY THE NET
SYSTEM SURVIVABILITY IMPROVEMENT WITH RAM TRADE-OFF	- PERCENT MORE COMBAT CAPABLE SYSTEMS AVAILABLE DURING A PERIOD OF COMBAT OPERATIONS
AIR DEFENSE WEAPON SYSTEM	- PERCENT OF THREAT A/C KILLED - PERCENT FRIENDLY A/C ENGAGED
TRUCK SYSTEM	- SAFE TRANSPORT PAYLOAD IAW OMS/MP - PROBABILITY OF SAFE LOAD/UNLOAD
SURVIVABILITY IMPROVEMENT	- PERCENT OF TARGETS ENGAGED/KILLED - PERCENT OF ENGAGEMENTS BY THREAT

Figure E-5. Characteristics of interest—mission accomplishment examples

<u>SITUATION</u>	<u>MEASURE</u>
NEW WARHEAD FOR EXISTING "WOODEN" ROUND	- NO SUSTAINMENT ISSUE
SUSTAINMENT TRAINING (NORMAL CONSIDERATION)	- ABILITY TO DO CREW DRILLS AND TRAINING IN GARRISON OR - OPERATORS/CREWS PERFORM OPERATIONS ACCEPTABLY WITH ONLY EXPORTABLE TRAINING
SUSTAINMENT LOGISTICS (NORMAL CONSIDERATIONS)	- SUSTAIN THE SYSTEM FOR X DAYS COMBAT OPERATIONS OR - PERCENT OF COMBAT CAPABLE SYSTEMS AFTER REASONABLE DURATION

Figure E-6. Characteristics of interest—sustainment examples

(2) *Measures of performance.* Do use measures of performance that emphasize the system's operational effectiveness and suitability in terms of critical combat missions to be accomplished. Do not use measures of effectiveness such as Force Exchange Ratio (FER), Loss Exchange Ratio (LER), or other such force level AoA measures that depend on large-scale modeling that is beyond the capability of the system evaluation. Operational tests do not normally provide enough trials or steady state operations to revisit the AoA.

(3) *Qualitative criteria.* Do specify qualitative criteria (which must be measurable) only when quantitative criteria are not applicable. Do not specify a confidence level. Statistical confidence levels are test resource drivers and better left to the tester and evaluator.

(4) *Test and evaluation limitation.* Do specify measures unconstrained by consideration of the applicable test/evaluation methodology to be used for resolution, if the characteristic is known to be critical and achievable. Accordingly, it will become an issue requiring resolution/adjudication above the COIC development team.

- Do not exclude a critical criterion because it can only be answered by technical test or simulation (criteria focus the operational evaluation and the decision, not a particular test).
- Do not compromise criteria to accommodate test and evaluation frailties (that is, T&E instrumentation, facilities, or other resources should not restrict the criteria if it is deemed critical). Tester and evaluator must find methods to provide the answer if at all possible. It may be that such criteria need to apply to later increments when technology provides for the new capability.

(5) *Probabilistic measures.* Do specify soldier-machine measures in terms of a medium value if a high degree of performance is not needed at IOC or 80/90 percent if a high degree of confidence is needed at IOC). This approach allows for improvement before IOC. Do not specify, or imply, 100 percent performance when the operation must be accomplished by soldiers. The term *imply* includes an absolute statement of capability (for example, crews will always initialize the system and achieve operational status within 30 minutes). Such a criterion needs an associated confidence statement. Changing operational circumstances tend to compromise crew 100 percent performance.

(6) *Conditions and definitions.* Do specify the conditions and definitions needed for evaluation (for example, the operational constraint (engagement envelope) and/or scoring criteria (stop/start point for a time line, destroy/kill definition, and so forth)). Do not leave ambiguities that can result in erroneous T&E of the criteria (for example, don't

say “more survivable” because survivability can be measured as either more combat vehicles remaining at a given point in time, or as more threat kills because the vehicle remains combat capable longer). Do not over specify constraints and definitions (for example, a constraint allowing operation only in temperatures above 70 degrees Fahrenheit would not support world-wide basic environment deployment).

(7) *Total system measures*. Do specify total system measures (for example, operator load vehicle, accomplish OMS/MP at stated speeds, C-130 roll-on/off, and so forth). Don’t specify component measures (for example, materiel/software performance, human factors constraints, technical standards, and so forth).

(8) *Lowest level system*. Do specify the lowest level system possible and appropriate (the preference is a single system but, when required, an organizational level may be more appropriate) (for example, a howitzer product improvement program used the individual howitzer for mission accomplishment and the battalion for battlefield availability (a measure that addresses survivability and operational readiness); communications systems normally use nets for mission accomplishment and key components for set-up/tear-down time; trucks are typically assessed with trailers, and so forth). Do not measure a structure that obscures performance of the system of concern (for example, a major performance improvement to vehicle type in a fleet may provide significant improvement in overall platoon operations and only slight improvement in some combined arms team measures).

(9) *Higher order measures*. Do specify higher order measures (for example, percent target kill, percent messages sent and received, and so forth). Do not specify “eaches” (for example, probabilities of detection, identification, hand-off, engagement, hit, and kill given a hit for a weapon; probabilities of connectivity, message receipt given connectivity and being available for a communications system, and so forth).

(10) *Baseline comparison*. Do specify baseline comparison criteria only when appropriate (see para E-4b(3)) and state an improvement percentage when the acquisition objective is improved performance and the end result will be higher system cost. Do not state an improvement percentage for baseline comparison when cost benefit is the reason for the acquisition. Do not use statistical significance as rationale for the stated improvement percentage.

(11) *Quantitative criteria*. Do use quantitative criteria, which are preferred when possible. Do not use qualitative criteria unless quantitative criteria cannot be developed or are not applicable.

(12) *“Lessons learned” (recent experiences)*. Do apply “lessons learned” from previous evaluations to avoid pitfalls. Do not allow duplicate or overlapping criteria unless absolutely necessary (that is, a system should not be placed in double jeopardy for a single shortcoming).

E-5. Identifying and developing the rationale in COIC

a. *The rationale*. The rationale, by definition, provides justification for the criteria, not the issue, and an audit trail to the requirements specified in the MNS, ORD, AoA, and system specification. It states the reason for selecting a particular characteristic or capability and identifies by document and paragraph the source of the information. In the case of derived criteria, the rationale will provide the basis and methodology used. Considering the operational nature of COIC, the rationale for the requirements is often as important as the requirement in establishing and justifying the criteria. The rationale should not be separated from the COIC since understanding the basis for a criterion is critical during its evaluation.

b. *Questions to ask when developing the rationale for COIC*.

(1) *References*. Are appropriate source references included for all criteria? Is there one or more ORD paragraph(s) referenced for each criterion stated?

(2) *Derived criteria*. Are the basis and methodology discussed for all “derived” criteria (for example, probability of kill incorporates probabilities of detection, identification, engagement, hit, and kill given a hit)?

(3) *AoA relationship*. Is the relationship between the criteria and AoA results addressed where applicable (for example, the ORD requires improved survivability (that is, over that of the baseline system) and the AoA identifies a minimum requirement for 20 percent more combat capable systems (for example, survivability and reliability trade off) to make the program the preferred alternative)?

c. *Do and do not in developing the rationale*.

(1) *Criteria justified*. Do provide a complete justification for each criteria.

— Do not justify the issue.

— Do not inject new/additional criteria into the rationale.

(2) *Criteria audit trail*. Do establish a complete audit trail by indicating the specific document and paragraph within the document from which each criterion was derived or extracted. Every criterion must have a basis in the ORD. This does not mean that it must be a direct lift.

(3) *Criteria to AoA linkage*. Do provide a defined relationship between COIC and AoA MOE/MOP whenever possible such that the system evaluator can evaluate AoA impacts should there be shortfalls against COIC.

(4) *Critical mission justification*. Do justify why a particular mission or use was selected when multiple missions or uses are possible.

E-6. Identifying and developing the notes in COIC

a. *Use of notes.* Mandatory notes and any other required notes, explanations, or definitions will be included after the last issue set. They serve to: emphasize the purpose and scope of COIC in relation to the full set of evaluation focus area measures; place T&E results related to COIC in the proper perspective; and discuss lengthy T&E conditions or definitions.

b. *Mandatory note #1.*

(1) *The note.* Note used to reflect appropriate characteristics applicable for the specific system (for example, if a maintenance ratio is included as a criterion, then RAM may not apply to this note): “Note #1. Criteria X, Y, and Z are total system measures. As such, they inherently cover hardware, software, personnel, doctrine, organization, and training. System individual characteristics of operational capability, survivability, RAM, organization, doctrine, tactics, logistics support, training, and MANPRINT (which includes the domains of manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability) related to these criteria will be provided by the system evaluator in the SEP.”

(2) *Discussion of note #1.* This note serves to emphasize to the COIC developer that total operational system measures are preferred. This note acknowledges that some criteria will not be total operational system measures, and identifies for the evaluator and reviewers those designated criteria (X, Y, and Z) that are in fact total operational system measures. This note commits to addressing the more detailed system individual characteristics in the SEP.

c. *Mandatory note #2.*

(1) *The note.* Provide the following note: “Note #2. Criteria are not provided as automatic (default) pass/fail measures. Rather they represent estimates of performance for which a breach would require a careful senior level management reassessment of cost effectiveness and program options during the program milestone decision review.”

(2) *Discussion of note #2.* This note emphasizes that criteria are not “automatic” pass/fail measures. This note highlights the fact that breach of a criterion constitutes a “show stopper” until convincing evidence can be presented to decision-makers that the program should proceed in spite of the shortfall. Convincing evidence might include a revised risk assessment, specific observations and data from operational tests, baseline comparison data, AoA updates, or a revised threat assessment.

d. *Mandatory note #3.*

(1) *The note.* Provide the following note when COIC applicable to the MS B TEMP and the FRP DR are separate from MS C: “Note #3. These COIC are derived from the user’s initial requirements for the system. These COIC will be updated prior to MS C based on the revised ORD and final updated AoA.”

(2) *Discussion of note #3.* This note is applicable only for COIC in support of the TEMP approved in advance of MS B. This note highlights the fact that COIC for the MS B TEMP may contain “soft” criteria that will be updated as the system matures. Note #3 applies to COIC when “soft” criteria are used in support of the initial TEMP required for program initiation. The intent is to update the COIC and TEMP before testing/other data gathering events in support of the system evaluation required for the DRP DR. When an evolutionary acquisition is pursued, a similar note would apply for each future increment having “soft” criteria.

e. *Other notes.* System peculiar notes are those necessary for understanding. They will commonly focus on definitions or lengthy test and evaluation conditions.